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RAIL SECTION FOR FIXING A STRETCHED WEB, FALSE PARTITION  
SUCH AS A FALSE CEILING OR FALSE WALL COMPRISING SAME

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The invention relates to the technical field of stretched false ceilings and walls.

A large number of embodiments using such false ceilings are already known in the prior art.

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By way of examples, reference can be made to the patent applications in France published under the following numbers :

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2 767 851, 2 751 682, 2 734 296, 2 712 006, 2 707 708, 2 703 711, 2 699 211, 2 699 209, 2 695 670, 2 691 193, 2 688 849, 2 685 036, 2 645 135, 2 630 476, 2 627 207, 2 624 167, 2 623 540, 2 619 531, 2 597 906, 2 611 779, 2 592 416, 2 587 447, 2 561 690, 2 587 392, 2 552 473, 2 537 112, 2 531 012, 2 524 922, 2 475 093, 2 486 127, 2 523 622, 2 310 450, 2 270 407, 2 202 997, 2 175 854, 2 145 147, 2 106 407, 2 078 579, 2 002 261, 1 475 446, 1 303 930, 1 287 077.

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By way of examples, reference can also be made to the following documents : US-A-5 058 340, US-A-4 083 157, EP-A-643 180, EP-A-652 339, EP-A-588 748, EP-A-504 530, EP-A-338 925, EP-A-281 468, EP-A-215 715, EP-A-089 905, EP-A-043 466, WO-A-94/12741, WO-A-92/18722.

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Reference can further be made to the following patent applications in France originating from the Applicant: 2 736 615, 2 756 600, 2 727 711, 2 712 325, 2 699 613, 2 695 670, 2 692 302, 2 658 849.

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The materials known in the prior art for manufacturing false stretched ceilings or walls are most often polymers provided with a large number of qualities such as in particular fire resistance, air tightness, that is being dust-proof and damp-proof, and ease of maintenance.

False ceilings obtained by means of such materials can

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incorporate heat insulants, spot lights or various lighting elements, as well as ventilation or aeration openings or sprinklers.

As said false ceilings are dismountable, any intervention can be made in the plenum chamber of an air heater.

The polymers for stretched ceilings known in the prior art, regardless of whether they are translucent or opaque, possibly mass-tinted, matt, lacquered, marbled, suede or satin lustre, can thus be used both in an industrial and hospital environment, for collective equipment, laboratories or dwellings.

The lacquered finishing makes it possible to obtain a mirror effect used in shopping centres, a matt finishing appearing similar to a plaster aspect being most usually used for conventional decorations.

In a prior technique, the stretched fabrics or sheets on the roof or wall were definitively fixed by means of points or staples.

The conventional stretched false ceilings currently include :

- firstly, a horizontal frame fixed onto the upper portion of the walls of a room, said frame being an external rail formed by sections joined end to end,

- secondly, a web stretched horizontally inside said frame.

This arrangement enables the stretched ceiling to be dismantled.

Keeping the web in place with respect to the rail frame is obtained by various means, some examples of same being given below.

According to a first type of embodiment, the rail comprises a U-shaped groove defined by two walls, one of the two walls having a lip orientated towards the bottom of the groove, hooks being placed on the periphery of the web

As regards this first type of embodiment, reference can be made to the document FR-A-1 303 930.

As regards this second type of embodiment, reference can be made for example to the documents FR-A-1 475 446, FR-A-2 002 261.

As regards said third type of embodiment, reference can be made for example to the document FR-A-2 734 296.

As regards this fourth type of embodiment, reference can be made for example to the documents FR-A-2 699 211 and FR-A-2 537 112.

As regards this fifth type of embodiments, reference can be made for example to the documents FR-A-2 630 476, EP-A-388 925.

The stretched false ceilings are moreover mostly mounted with the web fully stretched horizontally.

In certain particular embodiments, as the web is

Considering that in certain embodiments the stretched ceilings had the drawback of showing the lower portion of the rail used to fix them, certain installers have offered the use of complex sections only partially masking said rail.

As specified in said prior document, a clip or finishing cover is provided to cover the lower portion of the rail. In other words, the complex section described in the document EP-338 925 remains visible as long as a finishing cover is not installed, which proves to be a long and tedious operation.

The document FR-2 619 531 describes in relation to a false ceiling or stretched false wall a rigid PVC rail provided with a recess defined by two vertical wings of different heights, namely a first wing of small height next to a wall and ending towards the bottom by a mobile perforated tongue extending in an oblique direction towards the higher second wing ; a fish-hook integral with the edge of a fabric able to be engaged between the two wings so as to take support both on the second wing and the perforated mobile tongue, said fabric of the stretched ceiling being thus deviated upwards so as to penetrate inside the recess by coming to rest and being

deviated against the lower extremity of the second wing.

The rail described in the document FR-A-2 619 531 has a large number of drawbacks. In particular, it remains visible after it has been mounted. Having regard to its small tapered section, the mobile tongue does not allow the fish-hook to be properly held in place. Increasing the tongue section would a priori reduce this problem but would make it more difficult to place the forked-tie.

The document FR-A-2 597 906 describes, as regards a false ceiling or a false stretched wall, a rail provided with a recess defined by two vertical wings of different heights, namely a first wing of very small height close to a wall and a second wing of greater height ; a forked-tie integral with the edge of a fabric able to be engaged between said two wings so as to fasten onto the second wing, said fabric of the stretched ceiling being thus deviated upwards so as to penetrate inside the recess whilst taking support and being deviated against the lower extremity of the second wing.

The rail described in the document FR-A-2 597 906, just like those of the documents FR-A-2 619 531 or EP-A-338 925, remains visible and, so as to mask the slit formed between the edge of the fabric and the wall on which the rail is fixed, a finish profile needs to be provided.

A first object of the invention is to provide a rail section for a false wall, said section able to be qualified as being invisible after the stretched fabric is mounted, this invisibility being obtained without fitting any type of finishing cover, said section ensuring a quick and safe fitting of the false partition fabric and having moreover a sufficiently simple construction so as to remain inexpensive.

With this aim in view, the invention relates according a first characteristic to a rail section for stretched fabric false partitions, said section comprising at least one groove defined by two lateral walls and a base wall, said groove

being intended to contain at least one edge of the stretched fabric after it has been mounted in the section, said section being made of a single piece and comprising a joint for retaining the edge of the stretched fabric in said groove and  
5 being made of a material having a flexibility differing from that of the material constituting the walls of said groove.

The cross section of said groove has a general U, V, pseudo-U or pseudo-V shape, the extreme portions of the lateral walls of the groove opposite the base wall of the  
10 groove defining an opening at least partially blocked by the joint for keeping the edge of the fabric stretched.

According to a first type of conception, the joint comprises a single lip projecting from one of the lateral walls of said groove, known as joint support wall, said lip  
15 comprising an internal face opposite the base wall of the groove and an opposing external face.

According to a first series of embodiments, the sections of said first type of conception have the following characteristics, possibly combined :

20 - the lip joint is an approximately flat joint, the internal face of the lip being approximately parallel to its external face,

- the single lip of the joint extends approximately perpendicularly or along an angle of several degrees and about  
25 65° with respect to the support wall.

- the free edge of the lip is placed inside the groove.

- the free edge of the lip is approximately in support against the lateral wall of the groove placed opposite the joint support wall,

30 - the single joint projects from the extreme part of its support wall.

According to a second series of embodiments, the sections of the first type of conception have the following characteristics, possibly combined :

- the lip of the joint comprises an internal face turned towards the base wall of the groove and an external opposing face, the internal face and the external face of the joint not being parallel to each other,

5 - the internal face of the single lip of the joint extends approximately perpendicular to its support wall or along an angle of several degrees and about 65° with respect to its support wall,

- the free edge of the lip is placed inside the groove,

10 - the free edge of the lip is substantially in support against the lateral wall of the groove placed opposite the joint support wall,

- the single lip projects from the extreme portion of its support wall,

15 - the external face of the single lip extends approximately perpendicular to the lateral walls of the groove.

According to a second type of design, the joint comprises two lips, projecting from one of the lateral walls of said groove, known as a joint support wall, namely a first lip known as a support lip and a second lip known as a masking lip, the internal face of the first lip, turned towards the base wall of the groove, being slanted with respect to the joint support wall, the external face of the second lip opposite the base wall of the groove being approximately perpendicular to the joint support wall.

According to a first series of embodiments, the section of the second type of design has the following characteristics, possibly combined :

30 - the two lips project from the extreme portion of the joint support wall,

- the free edge of the first lip is in support against the lateral wall of the groove placed opposite the joint support wall,

- the internal face of the first lip is slanted by an angle of several degrees and about 65° with respect to the joint support wall.

According to a second series of embodiments, the sections of the second type of design have the following characteristics, possibly combined :

- the joint comprises two lips, each lip projecting from one lateral wall of said groove and comprising an internal face opposite the base wall of the groove and an external face opposite,

- said two lips are approximately symmetrical with respect to a plane perpendicular to the base wall of the groove and placed halfway to the two lateral walls of the groove,

- the internal face of at least one of the two lips is slanted by an angle of several degrees about 65° with respect to the support lateral wall of said lip or extends approximately perpendicularly to the support wall of said lip,

- the external face of at least one of the two lips extends approximately perpendicularly to the support wall of said lip.

The lateral walls of the groove are made of an approximately rigid material selected from a group including metal alloys and rigid polymers, the joint being made of an approximately flexible material such as a flexible polymer.

The sections mentioned above can be obtained by co-extrusion or duplicate moulding of different materials, namely a first material constituting the approximately rigid walls of the groove, and a second material constituting the joint.

In one type of embodiment, the groove is made of rigid PVC-based material, possibly recycled, the joint being made of a flexible PVC.

In one particular embodiment, the section comprises an external wing from which perpendicularly projecting is a core





In another embodiment, the two lateral walls of the groove have different heights, the lateral first wall of the groove close to the wall having a smaller height than the second lateral wall, the external face of the joint being slanted so as to constitute a continuity solution between the extension plane of the stretched fabric and the lower extremity of the first lateral wall.

According to one type of embodiment, the external face of the joint is made of a material having a colour, tint and brilliance identical to or coordinated with those of the stretched fabric, the remaining of the section having a standard colour, tint and brightness.

To limit the risks of damaging the fabric when it is placed, the lower extremity of the second lateral wall of the groove under which the stretched fabric takes support is rounded.

In one particular embodiment, the false wall includes two horizontally coplanar stretched fabrics, the edges of said stretched fabrics being kept in the groove of a section fixed under the ceiling of a room, said section comprising an upper horizontal core extended downwards by a vertical central wing and two lower horizontal wings situated on both sides of the vertical central wing, the horizontal wings constituting the lateral walls of two opposing grooves and a joint support for keeping the edge excess thicknesses of the fabrics stretched.

Other objects and advantages of the invention shall appear in the following description of the embodiments, said description being given with reference to the accompanying drawings showing in cross-sectional views the various embodiments of the sections of the invention.

In the continuation of this description, the word "fabric" shall be designated by webs able to be made of a material selected from the group comprising woven or non-woven textiles fibres, polymer films, especially vinyl

It is understood that when said web is a polymer, it could be :

- provided with a flock coating to give it a velvet or fabric aspect. The surface of the fabric is for example coated with a suitable adhesive for finely cut textile fibres, the flock fibres being applied by sieving and beating or pressure projection, or even by electrostatic means when it is desired to obtain a high density of fibres,

- When said web is made of a polymer, its thickness is typically between several tenths of a millimetre and several millimetres.

Thus, for example many widths of polymer sheets of different widths and tints can be assembled by butt welding so as to constitute a cameo.

After having set forth these general points, several embodiments of the invention shall hereafter be described.

First, reference is made to figure 1.

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of a hook extending towards the wall 4 and open towards the bottom. Said hook can for example be made of a semi-flexible extruded polymer and comprise a proximal portion for linking to the fabric 1, and a curved distal portion. According to another variant, said excess thickness could have a fish-hook shaped cross section.

As it shall be apparent to an expert in this field, the sections of the invention may be used without particularly adapting the main types fixing means secured to the edges of the stretched fabrics.

The lower section 9 of the external wing 5 bears a slanted joint 12.

In the embodiment of figure 1, said joint 12 comprises a first lip 13 inside the groove 10 and approximately in support against the internal wing 7, and a flap 14 outside the groove 10 plated against the wall 4, the first lip 13 and flap 14 being approximately aligned and placed along an angle of 45° with respect to the external wing 5. The first lip 13 approximately blocks off the groove 10, whereas the flap 14 closes the interval I separating the external wing 5 and the wall 4. The joint and the flap hide the material constituting the external wing 5 of the section from the view of any observer in the room.

In other embodiments, not shown, the first lip 13 and the flap 14 are not aligned. For example, the first lip 13 is slanted with respect to the external wing 5 by an angle smaller than the angle of inclination of the flap 14 with respect to said external wing 5.

In other embodiments, the joint 12 comprises no flap 14, the external wing 5 being in direct support on the wall 4.

The fabric 1, when it is fixed on the section 3, is introduced into the groove 10 by taking support on the rounded extremity 8 of the internal wing 7. Owing to this, the fabric 1 slides onto said rounded portion 8 without any risk of being

damaged.

The fabric 1 is kept in place by being pinched between the first lip 13 of the joint 12 and the internal wing 7 of the groove 10. If necessary, the fabric can be also be kept in place or mainly by taking support on the excess thickness 11 against the internal face 15 of the internal wing 7 and against the internal face 16 of the first lip 13 of the joint 12.

In another embodiment (not shown), the excess thickness is kept squeezed between the internal face of the internal wing of the internal face of the external wing.

Placing the excess thickness 11 inside the groove 10 can be carried out for example by using a spatula so as make the excess thickness 11 pass between the first lip 13 of the joint 12 and the internal wing 7 and thus bring it into the groove 10 above the joint 12.

The first lip 13 of the joint 12 seals off the groove 10 and renders it undetectable to an occupant of the room who is looking at the ceiling from a normal distance.

In the embodiment shown on figure 1, the external wing 5 is placed at a short distance from the wall 4 by means of projections 17. This arrangement makes it possible for air to penetrate into the space E defined by the fabric 1 and the ceiling 2, the section 3 being provided with venting holes 18, the flap being also provided, here and there with traversing holes. In one variant, the flap has sufficiently slight flexibility to enable it to become warped when excess pressure enters the space I.

In the embodiment shown in figure 1, ventilation openings 18 are placed both on the internal wing 7 and the external wing 5. Thus, as shall be understood by an expert in this field, the ventilation holes can be placed solely on the external wing, the groove 10 having no holes.

In the embodiment of figure 1, the rail section 3

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polyesters, or synthesis elastomers of butadiene copolymer and acrylic nitrile type.

For example, the joint 12 could be made of a flexible PVC charged with a 60% plastifying agent, the remaining of the rail being in rigid PVC charged with a 10% plastifying agent. The table below shows the differences of mechanical properties between the flexible PVCs (typically above 60 parts for 100 parts of PVC resin) and the rigid PVCs (typically less than 30 parts for 100 parts of resin).

Property	Density (g/cm <sup>3</sup> )	Elongation on traction rupture (%)	Stress on traction rupture (Mpa)	Resistance to rupture on compression (Mpa)	Modulus of elasticity on bending (Mpa)
Flexible PVC	1.2	200-450	10-25	6-12	<2000
Rigid PVC	1.3-1.4	2-80	40-60	60-90	2000-3500

According to other embodiments, the joint 12 is made of polyvinyl chloride and the rest of the rail is made of polyethylene, impact polystyrene or styrene butadiene acrylonitrile.

The joint 12 could be coloured, tinted or brightnessy or have a different aspect from that of the rest of the rail section.

In one type of embodiment, the joint 12 is coloured, tinted or brightnessy and has an aspect closely related or coordinated with the fabric 1 so that the hook exhibits uniformity or has continuity of aspect with the fabric. As the rest of the rail is hidden from view, it could have a standard aspect and be made of a recycled or inferior material so as to reduce manufacturing costs.

In one particular embodiment, the joint 12 and/or the rest of the rail can be constituted by a two-grade material, namely a central portion of a lesser grade material and an elaborate aspect skin for all the visible portions, said skin being obtained by co-extrusion or flocking or by combining co-



extrusion and flocking.

In one particular embodiment, the first lip 13 of the joint 12 is made of a polymer having a different nature or flexibility than those of the flap 14 of said joint 12. Thus for example, the flap 14 of the joint 12 shall be highly flexible so as to counterbalance all the irregularities in the surface evenness of the wall 4, whereas the first lip 13 of the joint 12 shall exhibit at least a high flexibility so as to keep the fabric 1 firm inside the groove 12 of the rail 3.

In one particular embodiment, the joint 12 is made of a polymer, the remaining portion of the rail being made of a metal alloy, both of these elements being obtained by duplicate moulding. Thus, it is possible to obtain both straight and curved sections.

Reference is now made to figure 2 which illustrates one embodiment variant, the elements similar to those described above being designated by the same numerical references. The means for fixing the rail against the wall and/or the ceiling, such as screws, are not shown.

The main differences between the embodiment of figure 2 and that of figure 1 are as follows in the variant of figure 2:

- the flap 14 approximately marries the wall 4 against which the external wing 5 of the section 3 is plated,
- the upper portion of the external wing 5 is plated against the ceiling 2 so that the groove 20 is open towards the bottom.

The mounting of the fabric 1 on the rail 3 or assembling together of the rail portions by squares or linking rectangular bars as described with reference to figure 1 can be transposed to the embodiment of figure 2.

Reference is now made to figure 3 which is a detailed view of an embodiment variant of the joint 12. In this embodiment variant, the joint 12 comprises a first lip 13



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internal face 24 of the internal wing 7. Of course, the arrangement of said C-shaped groove could, in a variant, be as shown on figures 1 and 2.

5 As in the embodiment of figure 1, the hip-joint 14 shown on figure 4 can be provided in certain places with airing traversing holes.

10 The excessive thickness 11 in the shape of a hook in figure 4 can, in one embodiment variant, be kept tight in the groove 10 by being supported against the internal face 15 of the internal wing and against the internal face of the external wing 9.

Reference is now made to figure 5.

15 In the embodiment of figure 5, the section 3 made of a bimaterial comprises a joint 12 duplicate moulded or co-extruded onto the external the wing 5 of the edge of a groove with a P-shaped section. The edge of the fabric 1 comprises an already known "fish-hook" hooked against the extreme edge of the internal wing of the rail section, said extreme edge being approximately placed perpendicular to the external wing 5. The joint plates the fabric 1 against the internal wing 5 and masks the opening of the groove 10. The fish-hook is introduced for example with spatula and manoeuvred along the arrow F of figure 5.

25 Reference is now made to figure 6 which illustrates an embodiment variant in which the excess thickness 11 placed on the edge of the fabric 1 is plated under the effect of the joint 12 into a specific reserved space 24 in the internal wing 7 of the rail section 3.

30 Figure 7 diagrammatically illustrates the placing of a snap ring in an angle section between two walls, the angle section comprising two duplicate moulded or co-extruded joints 25, 26.

The embodiments diagrammatised on figures 8, 9 and 10 relate to sections comprising two grooves in each of which the

edge of a fabric can be placed and kept in place.

In the embodiment of figure 8, the angle section 30 comprises two external wings 27, 28 fixed against two approximately perpendicular walls, said fixing being obtained by means (not shown), such as screws or the like. The angle section moreover comprises a central wing 31 extending approximately at 45° with respect to the external wings 27, 28. Two pseudo U-shaped cross-sectional grooves 10 with bent inward base wall are thus formed, an excess thickness 11 integral with the edge of a fabric 1 able to be introduced inside said grooves and kept in place by means of joints 12 in a way similar to the way described with reference to the preceding figures. So as to avoid any possible problems occurring relating to an irregularity of the angle line 32 defined by the two walls, the section 3 comprises an indentation 33.

The angle profile diagrammatized on figure 9, like that of figure 8, comprises two grooves 10 but in which their cross-section is shaped like a straight U, a intermediate wing with a T-shaped section protruding from one of the external wings of the 1 section.

In the embodiment of figure 10, the angle section 3 comprises two U-shaped grooves each defined by an external wing and an internal wing, each of the wings bearing a joint 12 slanted towards the inside of the groove, the edge of the fabrics placed in the grooves 10 including a fish-hook able to take support against the internal face of the joints.

Figure 11 shows an embodiment of a section 3 for the wall angle, the placing and support of the edges of the fabric being obtained in a similar way to the one already described with reference to figures 8 to 10.

Reference is now made to figure 12 which diagrammatically illustrates an embodiment of the section in which the joint 12 is borne by the internal wing of the groove 10. When the joint

In, the embodiment of figure 15, a variant of the embodiment described with reference to figure 12, the groove 10 of the section is defined firstly by an internal wing 7 and secondly by the wall on which said section 3 is fixed. The

joint 12 is of the type of the one described with reference to figure 12 and the section is provided with a C-shaped groove for mounting squares or flat parts of the general type shown on figure 1.

5       As diagrammatised by the lines 1a, 1b on figure 15, in the embodiment of figure 15, the fabric 1 is not necessarily stretched perpendicular to the fixing wall of the section 3, but can be slanted (1a) or approximately parallel to the latter (1b).

10       The rail sections described above can be used for stretched fabric structures for decoration, masking or display, especially false ceilings, false walls in hospital and industrial environments or for collective equipment, and modern or historical dwellings.